K.R. MANGALAM UNIVERSITY
THE COMPLETE WORLD OF EDUCATION

Ph.D. Entrance Exam Syllabus (Forensic Sciences)

1. **Introduction to Forensic Science**

   Definition, History & Development, Scope, Ethics in Forensic Science, Nature, Types, Search methods, Collection, Preservation, Packing & Forwarding of Physical & Trace evidence for forensic analyses, Chain of Custody, Nature, Types, Preservation of Scene of Crime, Unnatural deaths, Criminal assaults, Sexual offences, Poisoning, Vehicular accidents, Types, powers and jurisdiction, Admissibility of evidence in Courts, Definition of Experts, Provisions in Cr.P.C.,1973 & Indian Evidence Act relating to experts & their reports; Court Procedures pertaining to Expert Testimony & Witness, NCRB and NICFS, Right of Equality **(**Articles 14 to 18) and Right of Freedom **(**Articles 19 to 22) as per Constitution of India, Profile of victim and culprit, its role in crime investigation, Lie detection (Polygraphy), Narco analysis, Brain mapping, scope and limitations

2. **Instrumentation**

   UV, Visible, IR, Raman, Atomic absorption, Emission Neutron Activation Analysis X – rays and x-ray-based techniques such as XRD, XRF Mass Spectroscopy Chromatographic Techniques: TLC, GLC, HPLC, HPTLC Hyphenated Techniques: GC-MS, LC-MS, IR-MS and ICP-MS Electrophoresis: High and Low voltage electrophoresis, Immunoelectrophoresis Immunoassays: Principle, Types, Techniques and applications

3. **Forensic Biology**

   Detection and Identification of Blood stains Determination of Species of Origin, Blood Group Systems Techniques of Determination of Blood groups of Blood Stains. Detection of Seminal and other body fluids and their Blood Grouping, Red cells Enzymes, Serum Proteins of forensic significance Disputed Paternity & Maternity DNA: Structure, DNAas genetic marker, DNA Extraction and Profiling Techniques DNA Phenotyping and RNA Profiling & their applications Wild life Forensics: Wild life (Protection) Act,1972,

4. **Forensic Chemistry**

   Analysis of Ethyl alcohol in beverages, liquors, biological fluids and breath Analysis of Methanol and Denaturants. Illicit liquors Analysis of Chemicals in Trap Cases. Metabolism and Chemical examination of Insecticides & Pesticides, Tranquillizers & Sedatives, Hypnotics

Stimulants, Narcotics, Opiates, Drugs of abuse; Analyses of above and their Toxicity. Plant poisons Metallic Poisons Extraction, Isolation & Clean-up procedures, Identification of common poisons from viscera, tissues and body fluids.

5. **Fire arms**

Types, Classification, Ammunition and their Compositions. Forensic examination of Firearms, Ammunition, Firearms' projectiles (Bullets, Shots, Slug etc.), Shell case Gunshot residues analysis Concept of Velocity, Penetration, Dispersion, Ricochet, Accidental Discharge, Determination of Range in firearm cases Examination of Country made firearms Basics of Internal, External and Terminal Ballistics Tool marks: Meaning, Types and Examination Restoration of Erased Markings on Metal Surfaces.\

6. Forensic Physics & Explosive Analyses

Petroleum Products and other incendiary materials Explosives: Definition, Types and Analyses, Bombs: Country made bombs, Improvised Explosive Devices (IEDs) and their examination Investigation in Explosion and Arson related cases Photography: Types, application in criminal investigation& Forensic evidence examination Hair & Fibers: Nature, Types, Structure and Examination. Pollens and Diatoms: Their application in Forensic investigation Dust & Soil: Nature, Types, Forensic Examination Paint, Lacquer & Varnishes: Nature, composition and forensic examination Glass: Composition, Types, Fractures, Examination Cement, Mortar and Concrete: General Composition, Forensic Analysis Computer Forensics: Introduction, Types of Computer crimes, Digital evidence- Seizure, Acquisition and Forensic examination Mobile Phone Forensics, Introduction, Significance, Structure of Human Voice apparatus, Voice spectrographs, Voice analysis, Legal aspects and limitations

7. **Documents**

Definition, Types, Preliminary examination of documents. Reproduction of documents through photographic and mechanical means and their examination. Examination of Alterations such as Erasures, Obliterations & Additions Indentations, Secret writings and Charred documents. Inks, Papers and their scientific examinations with modern methods, Age of documents Examination of Typescripts, Printed matter including currency notes and lottery tickets. Mechanical impressions Hand writings: Class and Individual characteristics of Handwritings, Factors affecting handwritings, Standard samples for comparison, Comparison of hand-written texts. Anonymous and disguised writings Identification of hand writings, signatures, detection of forged signature and forgeries Examination of Credit Cards and Similar materials Modes & Manner of deaths, Sexual offences and its medicolegal importance, Amendments in law related to sexual offences.

8. **Fingerprints and Others impression**

Fingerprint History, Characteristics, Types, Classification, Preservation, Development, Lifting and Comparison, Examination of Chance Prints, Computerization of Fingerprints, AFIS, Foot Prints, Shoe Prints, Tire Marks, Their Preservation & Casting, Comparison, Skid marks. Gait pattern, Biometric Systems of Identification and its relevance.

9. **Forensic Medicine**

Post mortem examination and Post mortem changes, Estimation of time since death Injuries & Wounds: Types, Medicolegal importance, Gunshot wounds Determination of Species of Origin, Sex, Age, Stature, and individual identification through skeletal remains Identification through Skull superimposition and facial reconstruction Human dentition, Type of teeth, determination of Age, Bite marks. Forensic Entomology: Introduction, Insects of forensic importance, Insects on Carrion, Forensic application.